

Appl. No. 10/657,131  
Amendment dated: August 22, 2005  
Reply to OA of: May 20, 20005

### **REMARKS**

Applicants have amended the claims to more particularly define the invention taking into consideration the outstanding Official Action. Claim 1 has been amended by specifying that the ammonium sulfate powder is encapsulated by only one layer of material. This amendment is supported by, e.g., page 5, lines 16-25, page 9, lines 4-13 and page 11, line 3 through page 12, line 3 of the specification.

In addition, new independent claim 22 has been added. Claim 22 incorporates the limitation of claim 9 into claim 1 without the limitation of a single layer encapsulation. Accordingly, claim 9 has been cancelled. New claim 22 is fully supported by the specification as originally filed. Applicants most respectfully submit that all the claims now present in the application are in full compliance with 35 U.S.C. §112 and are clearly patentable over the references of record.

The rejection of claims 1, 2, 5, 6, 7, 9 and 12-20 under 35 U.S.C. 103(a) as being unpatentable over Graham et al. in view of Kato has been carefully considered but is most respectfully traversed.

Applicants wish to direct the Examiner's attention to the basic requirements of a prima facie case of obviousness as set forth in the MPEP § 2143. This section states that to establish a prima facie case of obviousness, three basic criteria first must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations.

The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure: In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

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Section 2143.03 states that all claim limitations must be taught or suggested by the prior art. In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970). If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. In re Fine, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Applicants also most respectfully direct the Examiner's attention to MPEP § 2144.08 (page 2100-114) wherein it is stated that Office personnel should consider all rebuttal argument and evidence present by applicant and the citation of In re Soni for error in not considering evidence presented in the specification.

The outstanding Official Action states that while Graham discloses an insulation for rocket motors comprising EPDM rubbers, aramid fibers and ammonium sulfate, the reference does not teach particles of ammonium sulfate coated by a polyurethane material. Kato discloses crystalline ammonium sulfate fertilizer pellets with plural coatings. As explained at col. 11, lines 9-12 of Kato, the coating procedure disclosed produces an ammonium sulfate pellet coated with a first polyurethane oil layer, a second cumarone resin layer, and a third alkyd mixed with wax layer.

To the contrary, presently amended claim 1 recites an ammonium sulfate powder that is encapsulated by only a single layer, wherein the single layer is polyurethane rubber. The specification reveals that this single layer of polyurethane is important because it serves to prevent the taking up of air moisture during the process of making the insulation, and thus aids in stabilizing the physical properties of the insulation. The single layer of polyurethane also protects the ammonium sulfate from destruction caused by shearing force brought about in the course of milling and compounding.

Because Kato only discloses a plural coated ammonium sulfate pellet and not a single layer of polyurethane encapsulating ammonium sulfate powder, it is clear that the prior art references do not teach or suggest each and every element of the presently

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claimed invention as required by MPEP §2143. Further, there is no motivation in either Graham or Kato that would suggest modifying Kato to produce an ammonium sulfate powder encapsulated only by polyurethane as claimed in the present application. Thus, neither the references standing alone nor a combination of the references make out a proper Section 103 rejection. Accordingly, Applicant respectfully requests that this rejection be withdrawn.

With respect to new claim 22, the prior art fails to teach or suggest an ammonium sulfate powder having a diameter ranging from 50 micron to 80 micron. As discussed above, Graham discloses an ammonium sulfate powder with a particle size between 40 micron and 80 micron, but fails to teach such a powder covered with a single layer of polyurethane. Kato fails to remedy this deficiency because the pellet coating method disclosed therein cannot be applied to the powder taught in Graham. ~~Kato teaches~~ plural coating of ammonium sulfate pellets having a diameter of between 0.5 mm and 10 mm wherein the first coating is polyurethane oil. Applicants assert that it is not possible to uniformly coat ammonium sulfate powder with polyurethane oil using the method taught by Kato. This is because the method disclosed in Kato is effective only when dealing with larger diameter size ammonium sulfate pellets. This is supported by col. 2, lines 20-54 and col. 10, line 57 through col. 11, line 12 of Kato, wherein the general process of coating the ammonium sulfate pellets is described. In this process, polyurethane oil and ammonium sulfate pellets are added to a mixer. Agitation of the two materials yields large lumps and block masses of ammonium sulfate pellets due to the adhesive resin. Therefore, a subsequent step is required to separate the ammonium sulfate pellets. In the method disclosed in Kato, cumarone resin powder is used to accomplish separation. Ultimately, Kato requires the use of a small diameter powder to produce ammonium sulfate pellets covered in polyurethane oil.

Claim 22 recites ammonium sulfate powder with a diameter ranging from 50 micron to 80 micron. Please find attached scanning electron microscopic pictures of

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micro-encapsulated powder of the present invention provided by Applicants. When ammonium sulfate powder of the present invention is mixed with polyurethane, even more severe agglomerations of ammonium sulfate form than is the case when pellets are used (such as in Kato) due to the much smaller particle size of the powder. In order to ensure that the ammonium sulfate powder is uniformly coated and separated from a sticky block, the present invention uses the steps of dissolution, precipitation, solvent drying, vacuum distillation, dispersion in a polyol solution, addition of diisocyanate dropwise, and fluidized bed drying, as shown in Example 1 of the specification of the present application. No additional powder material (e.g., cumarone resin powder) is used to aid in separation of the agglomerations of ammonium sulfate powder.

The process disclosed in Kato, wherein another powder is introduced to aid in separation of the ammonium sulfate pellets, would not succeed in separating the powder of the present invention due to the similar particle size of the two powders. The process taught by Kato of coating ammonium sulfate pellets with polyurethane oil requires that the ammonium sulfate pellets have a large particle diameter in order for the small resin powder to be successful in the separation of the block mass of ammonium sulfate pellets. Therefore, Kato ultimately teaches away from the combination of Graham and Kato suggested in the Official Action because such a combination does not have a reasonable expectation of success. The coating method taught in Kato is limited to large pellet ammonium sulfate and therefore cannot be combined with Graham (which involves small particle size ammonium sulfate powder) to support a proper Section 103 rejection. Accordingly, Applicants respectfully request that this rejection be withdrawn.

To further aid in demonstrating the difference between the present invention and the Kato reference, Applicants provide the following table:

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	Present Invention	Kato (US 3,475,154)
Ammonium Sulfate (AS)	1. Supper fine particle, 50 $\mu$ m-80 $\mu$ m (5x10 <sup>-2</sup> mm - 8x10 <sup>-2</sup> mm) 2. Uniform in particle size	1. Pellet, 0.5 mm - 10 mm particle size 2. Large particle size distribution
Coating Method Used	1. Coating conducted in solution 2. On coat process with micro-encapsulation method 3. Only polyurethane is used to coat AS	1. Bulk coating in polyurethane oil 2. Pan coating method 3. Need resin powder to coat and separate the agglomerated polyurethane coated AS powder 4. AS coated by 3 layers
Coated Particles	1. AS is coated with a thin uniform layer of polyurethane	1. Heavy coated material on AS surface 2. Heavy coated AS is formed

The rejection of claim 3 under 35 U.S.C. 103(a) as unpatentable over Graham et al. in view of Kato as applied to claims 1 and 2 and further in view of Barton has been carefully considered but is most respectfully traversed.

As discussed above, neither Graham nor Kato teach or suggest each and every element of the claimed invention. Barton fails to remedy the deficiencies identified above. Because claim 3 depends from an independent claim that is nonobvious under 35 U.S.C. 103, Applicants respectfully request that this rejection be withdrawn.

The rejection of claims 4, 10 and 11 under 35 U.S.C. 103(a) as unpatentable over Graham et al. in view of Kato as applied to claims 1 and further in view of Hert has been carefully considered but is most respectfully traversed.


As discussed above, neither Graham nor Kato teach or suggest each and every element of the claimed invention. Hert fails to remedy the deficiencies identified above. Because claims 4, 10 and 11 depend from an independent claim that is nonobvious under 35 U.S.C. 103, Applicants respectfully request that this rejection be withdrawn.

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In view of the above comments and further amendments to the claims, favorable reconsideration and allowance of all of the claims now present in the application are most respectfully requested.

Respectfully submitted,

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